REMARKS

Reconsideration and allowance of the above-identified application are respectfully requested.

Claims 1-52 are currently pending, wherein claims 1, 13, 26 and 39 are independent. Claims 3, 4, 15, 16, 21, 28, 29, 34, 41, 42, 47 and 52 have been amended.

Applicants note with appreciation the allowance by the Patent Office of claims 1, 2, 5-8, 13, 14, 17-20, 26, 27, 30-33, 39, 40 and 43-46.

Applicants also note with appreciation the acceptance by the Patent Office of the drawings filed on August 17, 2004.

Applicants further note with appreciation the acknowledgment by the Patent Office of the information disclosure statements submitted on May 18, May 17, and March 4, 2005.

In the second section of the Office Action, claims 21 and 52 are objected to, because of certain informalities. These objections are respectfully traversed.

According to M.P.E.P. § 2173.02,

> [t]he examiner's focus during examination of claims for compliance with the requirement for definiteness of 35 U.S.C. 112, second paragraph, is whether the claim meets the threshold requirements of clarity and precision, *not* whether more suitable language or modes of expression are available. . . . Some latitude in the manner of expression and the aptness of terms should be permitted even though the claim language is not as precise as the examiner might desire. Examiners are encouraged to suggest claim language to applicants to improve the clarity or precision of the language used, *but should not reject claims or insist on their own preferences if other modes of expression selected by applicants satisfy the statutory requirement.* [M.P.E.P. § 2173.02 (emphasis added)]

Given the "latitude in the manner of expression and the aptness of terms" afforded to the Applicants, it is respectfully submitted that the aforementioned claims are clear and precise

and fully comply with the requirements of 35 U.S.C. § 112, second paragraph. Consequently, Applicants respectfully submit that there is no statutory basis for the objections to the claims based on "informalities."

However, to facilitate prosecution in the present application, Applicants hereby amend claims 21 and 52 merely to address the informalities noted by the Patent Office. In particular, Applicants hereby amend claim 21 to depend from claim 14, and amend claim 52 to depend from claim 2. In addition, Applicants hereby amend claim 34 to depend from claim 27, and amend claim 47 to depend from claim 40. These amendment do not narrow or otherwise limit the scope of the claims, are not made for any purpose related to patentability or to satisfy any statutory requirement, and are fully supported by the present application. No new matter has been introduced by way of this amendment.

Accordingly, reconsideration and withdrawal of these grounds of objection are respectfully requested. If these objections are repeated, the Patent Office is requested to specifically point out the statutory basis and authority for objecting to these claims.

In the fourth section of the Office Action, claims 3, 4, 9-12, 15, 16, 21-25, 28, 29, 34-38, 41, 42 and 47-52 are rejected under 35 U.S.C. § 112, second paragraph, for alleged indefiniteness. These rejections are respectfully traversed.

More particularly, the Patent Office asserts that all variables in each claim must be defined in the claim. [*see* Office Action, page 4] The Patent Office asserts that the variable "s^i_m," recited in claims 3, 15, 28 and 41, must be defined in the claims. Furthermore, the Patent Office states that the variable "$\mathrm{LLr}P_t$," recited in claims 4, 16, 29 and 42, must be

defined in the claims. In addition, the Patent Office asserts that the variable "$\mathrm{llrAPP_t}$," recited in claims 9-12, 21-25, 34-38 and 47-52, must be defined in the claims.

It is respectfully submitted that the Patent Office's assertion that the definition of all terms in a claim must be recited in the claim is incorrect, contrary to established tenets of patent law, and exhibits a clear misunderstanding of the requirements of 35 U.S.C. § 112, second paragraph.

According to M.P.E.P. § 2173.01,

> [a] fundamental principal contained in 35 U.S.C. 112, second paragraph is that applicants are their own lexicographers. They can define in the claims what they regard as their invention essentially in whatever terms they choose *so long as any special meaning assigned to a term is clearly set forth in the specification* . . . . Applicant may use functional language, alternative expressions, negative limitations, or any style of expression or format of claim which makes clear the boundaries of the subject matter for which protection is sought. As noted by the court in *In re Swinehart*, 439 F.2d 210, 160 USPQ 226 (CCPA 1971), a claim may not be rejected solely because of the type of language used to define the subject matter for which patent protection is sought. [M.P.E.P. § 2173.01 (emphasis added)]

Furthermore,

> [t]he meaning of every term used in a claim should be apparent from the prior art or from the specification and drawings at the time the application is filed . . . . *When the specification states the meaning that a term in the claim is intended to have, the claim is examined using that meaning*, in order to achieve a complete exploration of the applicant's invention and its relation to the prior art. [M.P.E.P. § 2173.05(a) (emphasis added)]

Accordingly, so long as the specification states the meaning that a term in a claim is intended to have, the Patent Office's assertion that all variables or terms in each claim must be defined in the claim is wholly and completely incorrect, exhibits a total and thorough misunderstanding of the requirements of 35 U.S.C. § 112, second paragraph, and flies in the

face of the "fundamental principle" contained in 35 U.S.C. § 112, second paragraph that applicants can be their own lexicographers.

Applicants again respectfully note that the specification of the present application clearly discloses the "special meaning" of the terms "$llrR_{ml}$," "$llrQ_{lm}$," "s^i_m," "$llrP_l$," and "$llrAPP_l$". At page 18, line 3, the term "$llrR_{ml}$" is disclosed as "[t]he information from equation node m to bit node 1, one for each connection." [present application, page 18, lines 3-4] At page 18, line 1, the term "$llrQ_{lm}$" is disclosed as "[t]he information from bit node 1 to equation node m, one for each bit." [present application, page 18, lines 1-2] At page 20, line 20, the term "s^i_m" is disclosed as "the sign of the mth equation." [present application, page 20, line 20] At page 17, line 29, the term "$llrP_l$" is disclosed as "[t]he soft information from channel APP (*a posteriori* probability) decoder or soft channel decoder 504 for the first iteration or from decision aided equalization circuit 856 for subsequent iterations, one for each bit." [page 17, lines 29-31] At page 18, line 5, the variable "$llrAPP_l$" is disclosed as "the overall soft information after each iteration, one for each bit." [present application, page 18, line 5] Consequently, it is respectfully submitted that the specification of the present application clearly sets forth the "special meaning" assigned to these terms, in complete compliance with the mandates of 35 U.S.C. § 112, second paragraph. Therefore, the Patent Office's assertion that the aforementioned terms must be defined in the claims is unwarranted and unfounded.

The Applicants note that the Patent Office "agrees that Applicants are their own lexicographers and can define in the claims what they regard as their invention in essentially

whatever terms they choose." [Office Action, page 3 (emphasis added)]. The Patent Office then asserts, however, that "it is the understanding of the examiner that language such as s^{i}_{m}, $llrP_{t}$, and $llrAPP_{t}$ are not **terms** but **variables**. These elements will change over time during operations performed by the device disclosed in the present invention." [Office Action, page 3 (emphasis in original)] It is respectfully submitted that the Patent Office is confusing and misunderstanding the mandates of 35 U.S.C. § 112, second paragraph.

The Patent Office correctly notes that according to the M.P.E.P., "[a] claim may be rendered indefinite by reference to an object that is variable." [Office Action, page 3, citing M.P.E.P. § 2173.05(b)] However, M.P.E.P. § 2173.05(b) also states that terms (including variables) need only be "as accurate as the subject matter permits." [M.P.E.P. § 2173.05(b), citing *Ex parte Brummer*, 12 U.S.P.Q.2d 1653 (Bd. Pat. App. & Inter. 1989), and *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1 USPQ2d 1081 (Fed. Cir. 1986)]

In *Ex parte Brummer*, the Board held that a limitation in a claim to a bicycle that recited "said front and rear wheels so spaced as to give a wheelbase that is between 58 percent and 75 percent of the height of the rider that the bicycle was designed for" was indefinite, because the relationship of parts was not based on any known standard for sizing a bicycle to a rider, but on a rider of unspecified size. [*see* M.P.E.P. § 2173.05(b)] It is respectfully submitted that no such analogous situation exists with respect to the aforementioned claims.

Unlike the situation in *Ex parte Brummer*, the expressions or variables used in claims 3, 4, 9-12, 15, 16, 21-25, 28, 29, 34-38, 41, 42 and 47-52 represent equations with established

and specified terms, and relationships between those terms, whether those equations are recited in the claim itself or defined in the specification, as is allowed under the mandates of 35 U.S.C. § 112. In other words, the equations define a "known standard" for each of the terms, expressions or variables recited in the aforementioned claims.

For example, dependent claim 3 recites that for the step of calculating $llrR_{ml}$, for each parity check equation, at iteration i-1, as recited in independent claim 1, is calculated as follows:

$$llrR_{ml}^{i-1} = \begin{cases} -s_m^{i-1} \cdot sign\left(llrQ^{i-1}{}_{lm}\right) \cdot min1^{i-1}{}_m, \text{ if } l \neq I_m^{i-1} \\ -s_m^{i-1} \cdot sign\left(llrQ^{i-1}{}_{lm}\right) \cdot min2^{i-1}{}_m, \text{ otherwise.} \end{cases}$$

Unlike a recitation of the height of a rider that is unspecified, the above equation and the terms and relationships between the terms used in that equation are fully specified with clarity and definiteness, either in the claim itself or in the specification. For example, it is respectfully submitted that the term $s^i{}_m$, disclosure of which can be found at least on page 20, line 20 of the present application, is not analogous to the situation in which the height of a rider of a bicycle is unspecified.

Applicants respectfully submit that the use of variables is not *per se* prohibited, as the Patent Office seemingly portends it to be. Furthermore, Applicants respectfully submit that not only are Applicants permitted to be their own lexicographer, so long as the terms are well defined in the specification, variables (as terms) in the claims are entirely permissible should that be the most accurate manner in which to claim the invention. It is respectfully submitted

that the use of the variables or terms in claims 3, 4, 9-12, 15, 16, 21-25, 28, 29, 34-38, 41, 42 and 47-52 is "as accurate as the subject matter permits," in full and complete compliance with the mandates and requirements of 35 U.S.C. § 112, second paragraph.

It is respectfully submitted that the Patent Office's reasoning with regard to the (supposed) requirements of 35 U.S.C. § 112, second paragraph is incorrect, confused and misguided. The Patent Office baldly states that "claims which [sic] incorporate these variables are rendered indefinite until the variables are defined in the claims." [Office Action, page 3] Applicants respectfully note that the Patent Office cites absolutely no authority for such a position. Thus, the Patent Office offers absolutely no authority or support for the bald proposition that a claim that incorporates the definition of the variable into the claim itself is definite, while a claim that includes the variable and provides the definition in the specification is not. The position and reasoning of the Patent Office simply do not follow from the law and are, therefore, untenable.

Contrary to the assertions of the Patent Office, given that Applicants can be their own lexicographers and that the meaning of these terms is apparent from the specification, it is respectfully submitted that claims 3, 4, 9-12, 15, 16, 21-25, 28, 29, 34-38, 41, 42 and 47-52 particularly point out and distinctly claim the subject matter for which the Applicants regard as the invention.

If this rejection is repeated, the Patent Office is requested to cite the statutory authority that requires that all terms in a claim must be defined in the claim when the specification clearly states the meaning that the terms in the claim are intended to have, and that "variables are rendered indefinite until the variables are defined in the claims." It is

respectfully submitted that no such requirements exist under 35 U.S.C. § 112, second paragraph.

However, merely to facilitate progress in the prosecution of the present application, Applicants hereby amend dependent claims 3, 15, 28 and 41 to recite that s^i_m comprises the sign of the mth equation. Support for these amendments can be found at least on page 20, line 20 of the present application. Applicants hereby amend dependent claims 4, 16, 29 and 42 to recite that $LLrP_l$ comprises soft information at iteration *i* in response to the decision aided equalizer, one for each bit. Support for these amendment can be found at least on page 17, lines 29-31 of the present application. Applicant also hereby amend dependent claims 21, 34, 47 and 52 to recite that $LLrAPP_l$ comprises overall soft information after each iteration *i*, one for each bit. Support for these amendments can be found at least on page 18, line 5 of the present application. It is respectfully noted that claims 9-12, 22-25, 35-38 and 48-51 variously depend from dependent claims 21, 34, 47 and 52. These amendments do not narrow or otherwise limit the scope of the claims, and are not made for any purpose related to patentability. No new matter has been introduced by way of these amendments.

Accordingly, reconsideration and withdrawal of these grounds of rejection are respectfully requested.

All of the objections and rejections raised in the Office Action having been addressed, it is respectfully submitted that the present application is in condition for allowance and a notice to that effect is earnestly solicited. Should the Examiner have any questions regarding this response or the application in general, the Examiner is urged to contact the Applicants' attorney, Andrew J. Bateman, by telephone at (202) 625-3547. All correspondence should continue to be directed to the address given below.

Respectfully submitted,

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